INVENTIONS & INNOVATION

Success Story

D'MAND® HOT WATER WASTE PREVENTION SYSTEM

New System Reduces Water-Heating Energy Requirements and Water Waste

Benefits

- Has saved more than 0.11 trillion Btu through 2000
- Has saved more than $800,000 through 2000
- Can be easily retrofitted into existing water heating systems
- Reduces initial capital cost and operating costs compared with recirculating system
- Reduces standby losses and extends water heater life

Applications

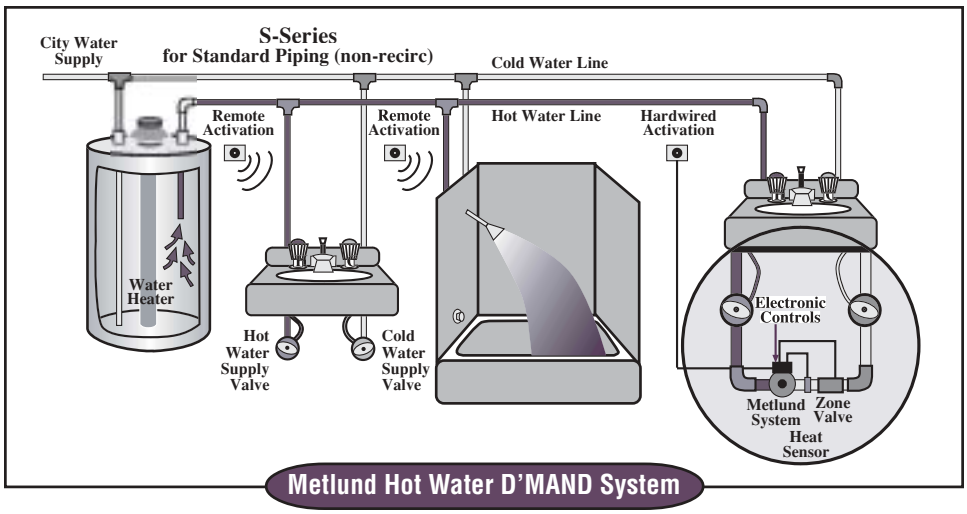
Can be used in single- and multi-family residential water heating systems, both retrofit and new construction; commercial and institutional water heating systems; and industrial process and service hot water systems.

"The Department of Energy's Inventions and Innovation Program has been extremely beneficial in helping to bring the Metlund D'MAND System into the market. The on-going support has allowed field and lab testing to determine the energy and water savings."

– Larry Acker
CEO
ACT, Inc.

In conventional potable hot water systems, water standing in the pipe is sent down the sewer drain until heated water arrives. This process wastes water. A conventional recirculating system is also wasteful because unused, recirculated heated water rejects heat through the entire loop. Advanced Conservation Technology (ACT), Inc., offers a novel system that conserves water and energy in water-heating systems. The Metlund® Hot Water D'MAND® system returns water in the hot water pipe to the boiler or water heater through the cold water line. The system uses a thermal sensor so the fixture demanding hot water only receives the water when the sensor observes a preset rise in temperature. Retrofit installations are simple because no additional return pipe to the water heater is required. In the residential D'MAND pumping system, the high-performance pump, integrated controller, and electronic zone valve are located at the hot water fixture farthest from the water heater. In residential new construction, the new pumps are generally located at the water heater but still operate on demand.

In industrial and commercial installations, each point-of-use fixture can be set to operate manually or can use motion detectors to begin circulation the moment a worker enters the facility. The system shuts off automatically when hot water is not needed. Commercial applications include doctors' offices, hospitals, veterinary clinics, kitchens, salons, day-care facilities, and restaurants. Industries are using the system in factory tool shops and restrooms and for parts washing stations that use a second occupancy sensor to start the water stream when the parts appear under the faucet.



Metlund Hot Water D'MAND System

System Economics and Market Potential

With assistance from the U.S. Department of Energy's Inventions and Innovation Program, ACT developed and demonstrated the D'MAND system. The Metlund Hot Water D'MAND System has created innovations and designs to effectively build homes with plumbing that saves both water and energy—"Structured Plumbing." The electronic Metlund D'MAND pumping system, when activated by a motion detector, flow switch, or other device, rapidly moves hot water from the water heater to the last fixture, making hot water available at each fixture along the way. A sensor detects the temperature rise and stops the pump.

In 2000 about 3800 Metlund D'MAND systems were sold, bringing total installations through 2000 to more than 20,000 units. Other innovative spinoff technologies from the Metlund D'MAND System have been or are being developed:

- **Hot Water D'MAND Appliance System –** This system, an electronic addition to dishwashers and clothes washers, starts the appliances only after hot water has arrived. Similar to the Metlund D'MAND System, it only works on the demand of the appliance.

- **Water Heater Vent Dampers –** This passive energy device incorporates a high-tech, lightweight titanium diaphragm into a small damper located prior to the flue pipe on top of gas-fueled water heaters to reduce standby loss by about 30%.

- **Water Heater Flue Gas Baffle –** This device improves heat transfer, efficiency, and life expectancy of water heaters during the combustion cycle.

- **Water Heater Heat Trap –** This device reduces standby losses attributable to heat flowing into both the inlet and outlet lines during periods of non-use. The trap is appropriate for both new construction and retrofit applications.

The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and to conduct early development. Ideas that have significant energy-savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

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